in America than in Britain, it is rather too much to expect that the wealth of information to be found in the pages of this book can be transferred lock, stock, and barrel across the Atlantic to our own benefit. Be that as it may, the book is well worth a close scrutiny by American readers: agriculturalists, horticulturalists, marine biologists, naturalists, climatologists, economists, and geographers. The problem of climatic change and its manifold effects on food supplies presents a challenge to all mankind. It is no exaggeration to say that man's ability to understand it better and to deal with it foresightedly could appreciably slow his inexorable retreat to the great Malthusian wall.

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Beryllium

A. A. Beus's **Geochemistry of Beryllium and Genetic Types of Beryllium Deposits** (translated by F. Lachman. Freeman, San Francisco, 1966. 411 pp., illus. $15) is an excellent review of the state of knowledge of the geochemistry and crystal chemistry of beryllium and the mineralogy and structure of beryllium deposits in the U.S.S.R. as of 1960, the year the original work was published. The translation editor, Lincoln R. Page, notes with regret the unavoidable omission of some recently discovered types of deposits, for example, the Spor Mountain deposits.

After an introduction summarizing the history of the study and utilization of beryllium, the author devotes a short chapter to the atomic structure and consequent crystal chemistry of beryllium, especially in minerals. Chapter 2, the longest in the book, is devoted to the mineralogy of beryllium. For each mineral are given the physical and optical properties, unit cell data, and structural details where available, and for most, many analyses drawn from both Russian and foreign literature. The author does not hesitate to disagree with accepted ideas of crystal structure for some of the minerals, and he offers interesting suggestions for further structural work. Regrettably, *d*-spacing data from x-ray determination are not furnished. Chapter 3 discusses the peculiarities of the isomorphous entry of beryllium into the crystal structure of minerals. The author recognizes four well-defined types of beryllium isomorphism: (i) with substitution of beryllium together with high-valence cations such as rare earths, zirconium, and titanium for silicon, (ii) with substitution of beryllium for silicon together with substitution of fluorine and hydroxyl for oxygen; (iii) with substitution of beryllium and hydroxyl for silicon; and (iv), isostructural isomorphous series of beryllium compounds.

The second section of the book begins with a summary of genetic classifications: "All known beryllium deposits are post-magmatic formations genetically related to the late stages of the pegmatitic process or to the various stages of hydrothermal-pneumatolytic or hydrothermal processes. The overwhelming majority of these deposits, including all industrial deposits, are related to acid intrusive rocks and are the products of pneumatolytic and hydrothermal separations of the granitic magma." In the ensuing chapters the three classes are considered in more detail.

Chapter 4 deals with pegmatic deposits, on which the author is a recognized expert. Seven types are recognized and examples, taken largely from the Russian literature, are described in great detail, with numerous clear maps and diagrams and well-reproduced photomicrographs. Deposits described before 1941 are identified with some precision; those described since then are identified much more vaguely, as is usual in the Russian literature. The zonal classification used in the U.S.S.R. is apparently even more detailed than that developed in this country during World War II. Some space is devoted to the economically unimportant but interesting desilicated and alkaline pegmatites, both unfamiliar to most American geologists. Suggestions for prospecting for rare elements in pegmatites are included. Chapter 5 is devoted to the hydrothermal-pneumatolytic deposits, including greisens and skarns. (Greisens are becoming economically important in the U.S.S.R.) Chapter 6 considers the hydrothermal deposits, including the famous Colombian emerald deposits.

Chapters 8, 9, and 10 consider the chemistry of the solutions from which the beryllium minerals are deposited in magmatic, pegmatitic, and hydrothermal-pneumatolytic processes and offer a wealth of information on the distribution of beryllium in rocks and rock-forming minerals of the U.S.S.R. Chapter 11 considers beryllium in the hypergene (supergene) processes and in sedimentation and furnishes much statistical information. Chapter 12 concludes that the beryllium clarke in the earth's crust is 3.5 parts per million, approximately equal to the concentration in the crust in the U.S.S.R.

The translation is in nearly idiomatic English, and the number of misprints is moderate. The translation editor has annotated some errors and peculiarities of usage. Seventeen pages of references conclude the volume.

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Fine Particles

Richard D. Cadle, the author of **Particles in the Atmosphere and Space** (Reinhold, New York, 1966. 234 pp., illus. $10), formerly chairman of the atmospheric chemical physics department at Stanford Research Institute and now a program scientist at the National Center of Atmospheric Research, has excellent qualifications for writing a book on this subject. Cadle says in the preface that his book "is intended to be intermediate in scope between an introduction to the subject and an exhaustive treatise," and in this he has succeeded admirably. He writes in a lucid style and has managed to include a great deal of information in 196 pages of text.

Cadle discusses particles in the troposphere and in the stratosphere and mesosphere; radioactive fallout; interplanetary dust; the moon; and planets, comets, and galactic dust. The longest chapter deals with radioactive fallout and the next longest with dusts of diverse origins in the troposphere and with cloud physics. Although, as Cadle himself writes, "no attempt has been made to provide an exhaustive review of the literature," there are 344 references conveniently placed at the ends of the chapters, with a separate index of their authors at the end of the book. The book is well illustrated with photographs, line drawings, and graphs.

I once considered writing such a book as this. It is a pleasure to find that someone else has accomplished a better